



T-814-DERI

DERIVATIVES AND RISK MANAGEMENT

8 ECTS

Year of study: 4th year (1st year MSc).
Semester: Spring.
Level of course: 6. Second cycle, advanced.
Type of course: Core for MSc Financial Engineering, elective for other programs.
Prerequisites: Undergraduate degree in engineering, plus selected finance courses such as Securities, Derivatives, Corporate Finance and Risk Management. **Other recommended prerequisites:** Financial engineering of the firm (T-814-FINA).
Schedule: Runs for 12 weeks – a total of 72 teaching hours.
Supervisor: Sverrir Ólafsson.
Lecturer: Sverrir Ólafsson.

Learning outcome: After completing the course the students will have good knowledge of how to identify, quantify and manage different types of risk. Students will learn to apply portfolio techniques to manage risk by diversification and to apply various methods including Value at Risk to quantify this risk. They will learn to use hedging techniques to manage risks across different markets and how to measure the efficiency of different hedging techniques. The risks considered include market risks, interest rate risks, credit risks and the risks resulting from an exposure to commodities prices.

Knowledge: On completion of this course students will have an extensive and practical knowledge of how to use hedging techniques to manage risks across different markets and how to measure the efficiency of different hedging techniques. They will have a clear appreciation of the different types of risk and their management by diversification and/or active hedging strategies.

Skills: On completion of this course students will be able to apply their knowledge of risk management techniques to a range of situations that expose corporations to risk. This includes exposure to interest rate movements, changes in foreign exchange rates as well as volatile commodity prices.

Competence: On completion of this course students will have the knowledge and the skills to confidently tackle different risk exposure situations corporations face. They will be able to suggest different possible approaches to each situation and to effectively compare them and select those most appropriate for a given situation.

All course descriptions may be subject to change. Revised information on the course schedule, reading material, teaching and learning activities, and assessment methods will be introduced in the learning management system Canvas at the beginning of the semester.



Content: The core focus of this course is 1) study risk management in terms of diversification and portfolio management, 2) study the use of derivatives in risk management and corporate finance, 3) analyse a range of hedging strategies in corporate and investment banking environment and 4) study credit risk, credit risk models, their usage by companies and financial institutions and their potential implications for systemic risk and financial stability.

To begin with we will go through basic concepts in portfolio theory, risk management and the relevant regulatory framework. We will discuss the importance of derivatives in managing risk exposure as well as the fundamentals of derivative pricing from a risk neutralising perspective. We will discuss how the theory of options can be applied to evaluate equity, cost of capital and investment opportunities. We will discuss the evaluation and origin of risk capital. Other topics will include the quest for optimal risk management strategy and the evidence that risk management strategies can deliver quantifiable value. We will view that evidence in the context of the Modigliani and Miller propositions. Towards the latter half of the course we will discuss credit risk in detail and develop some of the maths required for the quantification of default probabilities. We will study credit derivatives and some of the credit risk models available. Also, we analyse the impact default correlation has across individual firms, sectors, and different economic regions with implications for financial stability.

Several case studies will be discussed and analysed. We will look at real world cases and discuss “hot” topics in risk and risk management during the progress of the course.

Reading material: Provided by the teacher, will be introduced in the first lectures.

Teaching and learning activities: Interactive lectures, projects, and class exams.

Assessment methods: Continuous assessment; 35 - 40% projects, 60 – 65% class exams. No final exam.

Language of instruction: Icelandic/English.

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